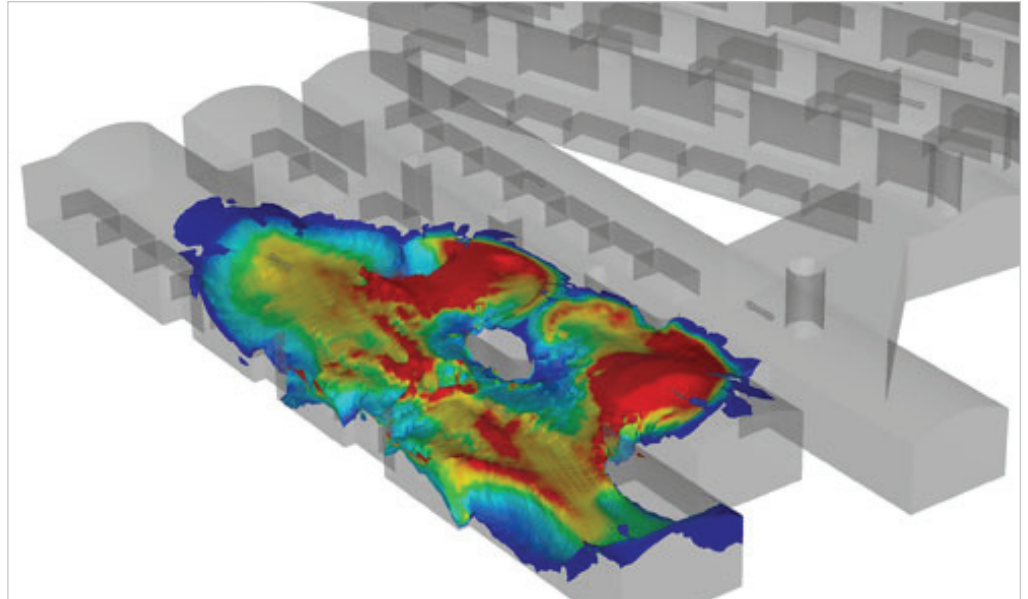


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—Chris Roach  
CFD Specialist  
Morson Projects

# Clearing the air.

## Morson uses Autodesk Simulation CFD to design a ventilation system that gives people time to escape a fire.



Fire safety analysis showing smoke will effectively clear from parking structure. Image courtesy of Morson Projects.

Morson Projects, headquartered in Manchester, United Kingdom, provides multidiscipline engineering, design, and project management services to international clients in a wide range of industries. A key sector of its business is ventilation and HVAC analysis for all types of process, commercial, and residential buildings. One of its most recent challenges was a design study of a proposed car park (parking garage) for Granary Wharf, a shopping and tourist center in Leeds, United Kingdom.

Although the car park encompassed only a single floor with 90 spaces and three exits/entrances, ventilation requirements were complex. Morson engineers were asked to produce an analysis of the car park to show the mechanical ventilation system would work as designed and adhere to British safety standards. The client also asked Morson to conduct an 8-megawatt fire analysis—the equivalent of the energy given off by two cars on fire—to show that the ventilation system would clear smoke adequately enough within 60 seconds to allow people to escape the car park safely. Two months after conducting this analysis, the client asked Morson to simulate the effects of smoke after 180 seconds.

Morson used Autodesk® Simulation CFD to analyze air flow of the car park under normal circumstances. Different layout arrangements of the jet fans were tested to optimize air flow and extraction rates in

the car park to prevent carbon monoxide build-up. For the fire simulation, Morson engineers set up a transient analysis to show smoke movement through the structure without fans. Those results were then compared to a full 8-megawatt analysis, which showed what would happen when the optimized jet fans were turned on to remove the smoke.

Positions of the fans and the fires were changed to optimize smoke removal and to improve areas where the local mean age of air (LMA) was too high. “LMA is the period of time a quantity of air is circulated around the same area or building,” explains Chris Roach, computational fluid dynamics (CFD) specialist for Morson. “When you select ‘residence time’ within Autodesk Simulation CFD, it automatically shows results on a plot or isosurface. This is one of the most important features we use for CFD analysis.” Autodesk, Inc. added the LMA feature to Autodesk Simulation CFD at Roach’s request.

Autodesk Simulation CFD’s ability to output features, plots, and animations showing transient conditions added richness to Morson’s reports—while saving the firm time. “Autodesk Simulation CFD has shortened the solution time of our analyses by almost two-thirds,” says Roach.

To learn more about Autodesk Simulation CFD, visit [www.autodesk.com/simulationcfd](http://www.autodesk.com/simulationcfd).